

# **Pending Claims:**

This listing of claims represents the claims pending in this application.

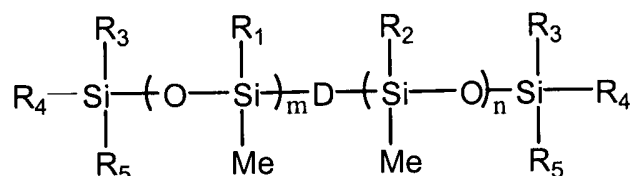
## **Listing of Claims:**

1. (Currently amended) A probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:

(i) ~~an abrasive~~ a substrate layer comprising abrasion means for loosening debris on probes; and

(ii) a tacky gel layer, wherein said tacky gel layer is in contact with the ~~abrasive surface of the abrasive~~ substrate layer; said tacky gel layer comprising:

(a) a silicone base resin having the Formula I:



wherein:

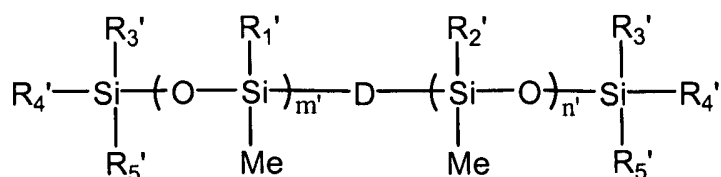
R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are independently selected from: hydrogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> haloalkyl, vinyl or C<sub>1-6</sub> acryloxyalkyl, and at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is a vinyl group;

D is a divalent linkage selected from the groups consisting of: -O-, -S-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>O- and -O(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, wherein r is an integer from 0-10;

n and m are independently integers from 0 to 1000, and the sum of n and m is not less than about 10; and

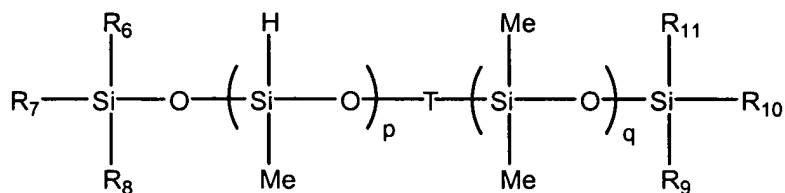
(b) a cross-linking compound selected from:

(i') a compound having the Formula II:



wherein,  $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ ,  $m$  and  $n$  are independently selected from the groups defining  $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ ,  $m$  and  $n$  above, with the proviso that vinyl is not present; or

(ii') a compound having the Formula III:

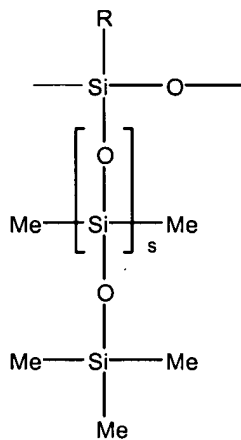


wherein:

$R_6$ ,  $R_7$ ,  $R_8$ ,  $R_9$ ,  $R_{10}$  and  $R_{11}$  are independently selected from: hydrogen,  $C_{1-20}$  alkyl,  $C_{1-20}$  haloalkyl, phenyl or  $C_{1-10}$  alkylphenyl;

$p$  and  $q$  are independently integers from 0 to 800; and

$T$  is selected from the group consisting of: a single bond,  $-(CH_2)_tCH_2-$ ,  $-(CH_2)_tCH_2O-$  ~~or~~ and



wherein:

$t$  is an integer from 0-10;  $R$  is selected from:  $C_{1-20}$  alkyl,  $C_{1-20}$  haloalkyl, phenyl or  $C_{1-10}$  alkylphenyl; and  $s$  is an integer from 0 to 800; and

(c) a catalyst;

further wherein:

the chain length of the silicone base resin as defined by the sum of the values for m and n of Formula I, is always greater than the chain length of the cross-linking compound as defined by the sum of the values for m' and n' of Formula II, or the sum the values for p, q and s of Formula III.

2. (Currently amended) The probe cleaning apparatus according to claim 1, wherein said ~~abrasive~~ substrate layer is comprised of a material selected from: a transition metal, metal alloy, composite compound, or naturally occurring material.
3. (Currently amended) The probe cleaning apparatus according to claim 2, wherein ~~an abrasive surface of said abrasive substrate layer~~ said abrasion means comprises said material in the form of a powder, particle, granule or crystal.
4. (Currently amended) The probe cleaning apparatus according to claim 3, wherein said ~~abrasive~~ substrate layer is homogeneous or heterogeneous.
5. (Currently amended) The probe cleaning apparatus according to ~~claim 2, wherein said~~ claim 1, wherein said substrate layer is comprised of a transition metal is selected from the group consisting of copper, nickel, palladium, tungsten, rhenium, rhodium and cobalt.
6. (Currently amended) The probe cleaning apparatus according to ~~claim 2, wherein said~~ claim 1, wherein said substrate layer is comprised of a metal alloy is selected from the group consisting of: palladium/cobalt, molybdenum/chromium and titanium/tungsten.
7. (Currently amended) The probe cleaning apparatus according to ~~claim 2, wherein said~~ claim 1, wherein said substrate layer is comprised of a composite compound is selected from the group consisting of: tungsten carbide, silicone carbide, silicon nitride, silicon oxide, aluminum nitride, chrome oxide and titanium nitride.
8. (Currently amended) The probe cleaning apparatus according to ~~claim 2, wherein said~~

claim 1, wherein said substrate layer is comprised of a naturally occurring material is selected from the group consisting of: silica, alumina, diamond, diamond-like carbon.

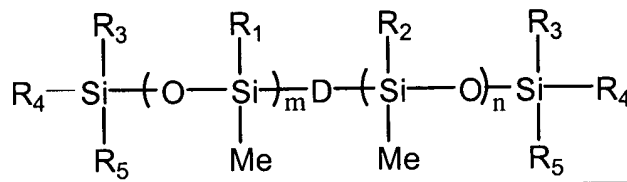
9. (Currently amended) The probe cleaning apparatus according to claim 2, wherein said ~~abrasive substrate layer has~~ abrasion means comprises surface abrasions obtained from one or more of: surface roughening, plating up, etching, stamping, cutting into the substrate surface, molding or sputtering.

10. (Currently amended) ~~The probe cleaning apparatus according to claim 9,~~ A probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:

(i) an abrasive substrate layer; and

(ii) a tacky gel layer, wherein said tacky gel layer is in contact with an abrasive surface of the substrate layer; said tacky gel layer comprising:

(a) a silicone base resin having the Formula I:



wherein:

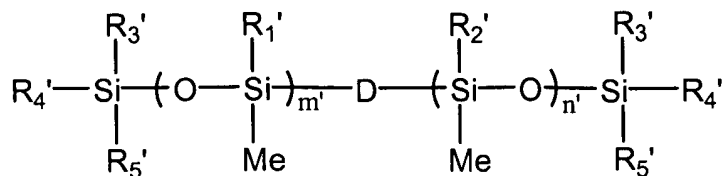
R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are independently selected from: hydrogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> haloalkyl, vinyl or C<sub>1-6</sub> acryloxyalkyl, and at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is a vinyl group;

D is a divalent linkage selected from the groups consisting of: -O-, -S-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>O- and -O(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, wherein r is an integer from 0-10;

n and m are independently integers from 0 to 1000, and the sum of n and m is not less than about 10; and

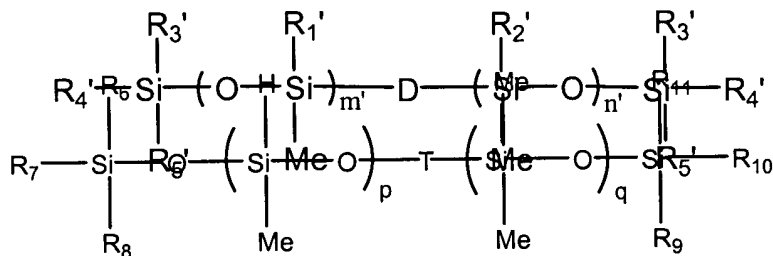
(b) a cross-linking compound selected from:

(i') a compound having the Formula II:



wherein,  $R_1', R_2', R_3', R_4', R_5', m'$  and  $n'$  are independently selected from the groups defining  $R_1, R_2, R_3, R_4, R_5, m$  and  $n$  above, with the proviso that vinyl is not present; or

(ii') a compound having the Formula III:

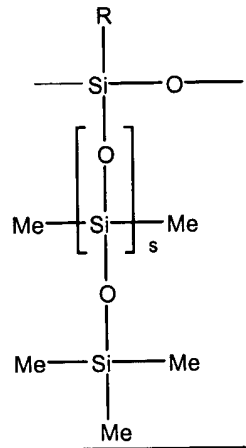


wherein:

$R_6, R_7, R_8, R_9, R_{10}$  and  $R_{11}$  are independently selected from: hydrogen,  $C_{1-20}$  alkyl,  $C_{1-20}$  haloalkyl, phenyl or  $C_{1-10}$  alkylphenyl;

$p$  and  $q$  are independently integers from 0 to 800; and

$T$  is selected from the group consisting of: a single bond,  $-(CH_2)_tCH_2-$ ,  $-(CH_2)_tCH_2O-$  and



wherein:

t is an integer from 0-10; R is selected from: C<sub>1-20</sub> alkyl, C<sub>1-20</sub> haloalkyl, phenyl or C<sub>1-10</sub> alkylphenyl; and s is an integer from 0 to 800; and

(c) a catalyst;

further wherein:

the chain length of the silicone base resin as defined by the sum of the values for m and n of Formula I, is always greater than the chain length of the cross-linking compound as defined by the sum of the values for m' and n' of Formula II, or the sum the values for p, q and s of Formula III; and

said apparatus further comprising alternating regions of a said tacky gel layer and an abrasive surface.

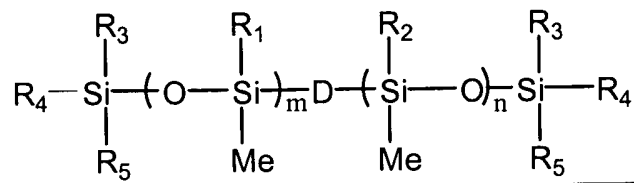
11. (Original) The probe cleaning apparatus according to claim 10, wherein said alternating regions of the tacky gel layer rest on the abrasive surface of the abrasive substrate, or said alternating regions of the tacky gel layer are partially embedded in the abrasive substrate.

12. (Currently amended) ~~The probe cleaning apparatus of claim 2, wherein~~ A probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:

(i) an abrasive substrate layer having an abrasive surface comprising dendritic patterned abrasions; and

(ii) a tacky gel layer, wherein said tacky gel layer is in contact with an abrasive surface of the abrasive substrate; said tacky gel layer comprising:

(a) a silicone base resin having the Formula I:



wherein:

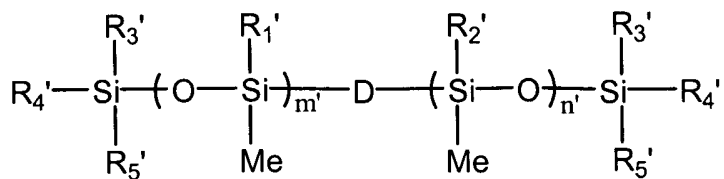
R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are independently selected from: hydrogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> haloalkyl, vinyl or C<sub>1-6</sub> acryloxyalkyl, and at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is a vinyl group;

D is a divalent linkage selected from the groups consisting of: -O-, -S-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>O- and -O(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, wherein r is an integer from 0-10;

n and m are independently integers from 0 to 1000, and the sum of n and m is not less than about 10; and

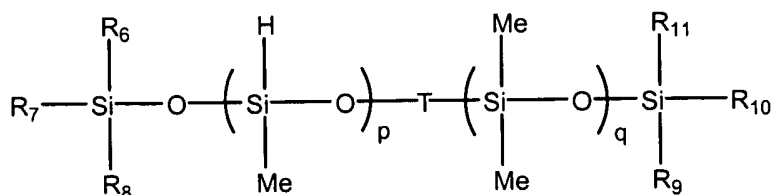
(b) a cross-linking compound selected from:

(i') a compound having the Formula II:



wherein, R<sub>1</sub>', R<sub>2</sub>', R<sub>3</sub>', R<sub>4</sub>', R<sub>5</sub>', m' and n' are independently selected from the groups defining R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, m and n above, with the proviso that vinyl is not present; or

(ii') a compound having the Formula III:

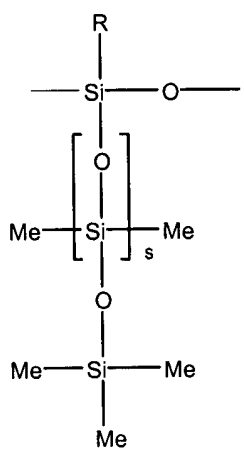


wherein:

R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub>, R<sub>10</sub> and R<sub>11</sub> are independently selected from: hydrogen, C<sub>1-20</sub> alkyl, C<sub>1-20</sub> haloalkyl, phenyl or C<sub>1-10</sub> alkylphenyl;

p and q are independently integers from 0 to 800; and

T is selected from the group consisting of: a single bond, -(CH<sub>2</sub>)<sub>t</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>t</sub>CH<sub>2</sub>O- and



wherein:

t is an integer from 0-10; R is selected from: C<sub>1-20</sub> alkyl, C<sub>1-20</sub> haloalkyl, phenyl or C<sub>1-10</sub> alkylphenyl; and s is an integer from 0 to 800; and

(c) a catalyst;

further wherein:

the chain length of the silicone base resin as defined by the sum of the values for m and n of Formula I, is always greater than the chain length of the cross-linking compound as defined by the sum of the values for m' and n' of Formula II, or the sum the values for p, q and s of Formula III.

13. (Original) The probe cleaning apparatus according to claim 12, wherein said dendritic patterned abrasions are the same material as the abrasive substrate, and said material is a



transition metal.

14. (Original) The probe cleaning apparatus according to claim 13, wherein said transition metal is selected from the group consisting of: copper, nickel, palladium, tungsten, rhenium, rhodium and cobalt.

15. (Original) The probe cleaning apparatus according to claim 14, wherein said transition metal is copper.

16. (Original) The probe cleaning apparatus according to claim 14, wherein the dendritic patterned abrasions further comprise a coating of a harder material, wherein said coating has the same configuration as the dendritic abrasions.

17. (Original) The probe cleaning apparatus according to claim 16, wherein said harder material is selected from: tungsten carbide, titanium nitride, or diamond.

18. (Original) The probe cleaning apparatus according to claim 1, wherein for the silicone base resin of Formula I, the sum of m and n is from about 10 to 1000.

19. (Original) The probe cleaning apparatus according to claim 1, wherein D is oxygen.

20. (Original) The probe cleaning apparatus according to claim 1, wherein  $R^3$  is vinyl.

21. (Original) The probe cleaning apparatus according to claim 20, wherein either of or both of  $R^4$  and  $R^5$  are methyl.

22. (Original) The probe cleaning apparatus according to claim 1, wherein the cross-linking compound has the Formula II.

23. (Original) The probe cleaning apparatus according to claim 22, wherein the silicone base resin has the Formula I, and  $R^3$  is vinyl.

24. (Original) The probe cleaning apparatus according to claim 22, wherein for the silicone base resin of Formula I, either of, or both of  $R^4$  and  $R^5$  are methyl.
25. (Original) The probe cleaning apparatus according to claim 22, wherein the silicone base resin has the Formula I, and D is oxygen.
26. (Original) The probe cleaning apparatus according to claim 1, wherein the cross-linking compound has the Formula III, and the sum of p and q is from about 0 to 800.
27. (Original) The probe cleaning apparatus according to claim 26, wherein T is a single bond.
28. (Original) The probe cleaning apparatus according to claim 26, wherein  $R^6$ ,  $R^7$ ,  $R^8$ ,  $R^9$ ,  $R^{10}$  and  $R^{11}$  are methyl.
29. (Currently amended) A probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:
- (i) ~~an abrasive~~ a substrate layer comprising abrasion means for loosening debris from probes; and
  - (ii) a tacky gel layer, wherein said tacky gel layer is in contact with ~~the abrasive surface of the abrasive~~ substrate layer; said tacky gel layer comprising:
    - (a) a vinyl siloxane containing silicone base resin having a viscosity of from about 2000 to 10,000 cps; and
    - (b) a hydrosiloxane containing cross-linking compound having a viscosity of from about 2 to 1000 cps, wherein the cross-linking compound does not contain a vinyl group; and
    - (c) a catalyst.
30. (Currently amended) The probe cleaning apparatus according to claim 29, wherein said ~~abrasive~~ substrate layer is comprised of a material selected from: a transition metal, metal alloy,

composite compound, or naturally occurring material.

31. (Currently amended) The probe cleaning apparatus according to claim 30, wherein ~~an abrasive surface of said abrasive substrate layer~~ said abrasion means comprises said material in the form of a powder, particle, granule or crystal.

32. (Currently amended) The probe cleaning apparatus according to claim 31, wherein said ~~abrasive~~ substrate layer is homogeneous or heterogeneous.

33. (Currently amended) The probe cleaning apparatus according to claim ~~29~~30, wherein said transition metal is selected from the group consisting of: copper, nickel, palladium, tungsten, rhenium, rhodium and cobalt.

34. (Currently amended) The probe cleaning apparatus according to claim ~~29~~30, wherein said metal alloy is selected from the group consisting of: palladium/cobalt, molybdenum/chromium and titanium/tungsten.

35. (Currently amended) The probe cleaning apparatus according to claim ~~29~~30, wherein said composite compound is selected from the group consisting of: tungsten carbide, silicone carbide, silicon nitride, silicon oxide, aluminum nitride, chrome oxide and titanium nitride.

36. (Currently amended) The probe cleaning apparatus according to claim ~~29~~30, wherein said naturally occurring material is selected from the group consisting of: silica, alumina, diamond and diamond-like carbon.

37. (Currently amended) The probe cleaning apparatus according to claim 29, wherein said ~~abrasive substrate layer has surface~~ abrasion means comprises abrasions obtained from one or more of: surface roughening, plating up, etching, stamping, cutting into the substrate surface, molding or sputtering.

38. (Currently amended) ~~The probe cleaning apparatus according to claim 37, A probe~~

cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:

- (i) an abrasive substrate layer; and
- (ii) a tacky gel layer, wherein said tacky gel layer is in contact with the abrasive surface of the abrasive substrate; said tacky gel layer comprising:
  - (a) a vinyl siloxane containing silicone base resin having a viscosity of from about 2000 to 10,000 cps; and
  - (b) a hydrosiloxane containing cross-linking compound having a viscosity of from about 2 to 1000 cps, wherein the cross-linking compound does not contain a vinyl group; and
  - (c) a catalyst; and

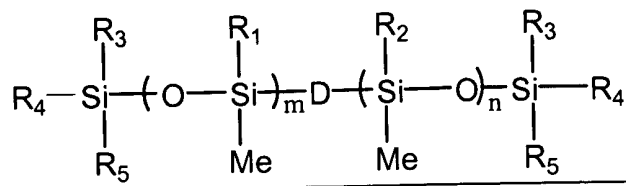
said apparatus further comprising alternating regions of a said tacky gel layer and an abrasive surface.

39. (Original) The probe cleaning apparatus according to claim 38, wherein said alternating regions of the tacky gel layer rest on the abrasive surface of the abrasive substrate, or said alternating regions of the tacky gel layer are partially embedded in the abrasive substrate.

40. (Currently amended) ~~The probe cleaning apparatus according to claim 29;~~ A probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:

- (i) an abrasive substrate layer having an abrasive surface comprising dendritic patterned abrasions; and
- (ii) a tacky gel layer, wherein said tacky gel layer is in contact with an abrasive surface of the abrasive substrate; said tacky gel layer comprising:
  - (a) a vinyl siloxane containing silicone base resin having a viscosity of from about 2000 to 10,000 cps; and
  - (b) a hydrosiloxane containing cross-linking compound having a viscosity of from about 2 to 1000 cps, wherein the cross-linking compound does not contain a vinyl group; and
  - (c) a catalyst.

41. (Original) The probe cleaning apparatus according to claim 40, wherein said dendritic patterned abrasions are the same material as the abrasive substrate, and said material is a transition metal.
42. (Original) The probe cleaning apparatus according to claim 41, wherein said transition metal is selected from the group consisting of: copper, nickel, palladium, tungsten, rhenium, rhodium and cobalt.
43. (Original) The probe cleaning apparatus according to claim 42, wherein said transition metal is copper.
44. (Original) The probe cleaning apparatus according to claim 40, wherein the dendritic patterned abrasions further comprise a coating of a harder material, wherein said coating has the same configuration as the dendritic abrasions.
45. (Original) The probe cleaning apparatus according to claim 44, wherein said harder material is selected from: tungsten carbide, titanium nitride, or diamond.
46. (Original) The probe cleaning apparatus according to claim 2, wherein said abrasive substrate layer is homogeneous and comprises a single material having an abrasive surface.
47. (Currently amended) ~~The probe cleaning apparatus according to claim 46,~~ A probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:  
    (i) an abrasive substrate layer; and  
    (ii) a tacky gel layer, wherein said tacky gel layer is in contact with an abrasive surface of the abrasive substrate; said tacky gel layer comprising:  
        (a) a silicone base resin having the Formula I:



wherein:

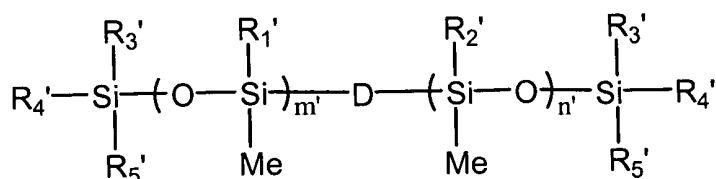
R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are independently selected from: hydrogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> haloalkyl, vinyl or C<sub>1-6</sub> acryloxyalkyl, and at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is a vinyl group;

D is a divalent linkage selected from the groups consisting of: -O-, -S-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>O- and -O(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, wherein r is an integer from 0-10;

n and m are independently integers from 0 to 1000, and the sum of n and m is not less than about 10; and

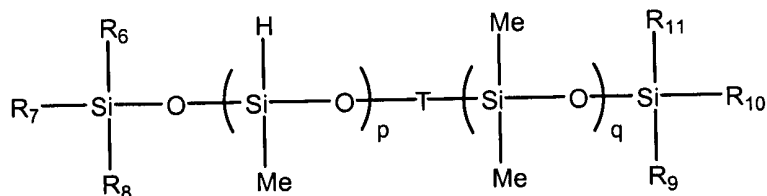
(b) a cross-linking compound selected from:

(i') a compound having the Formula II:



wherein, R<sub>1</sub>', R<sub>2</sub>', R<sub>3</sub>', R<sub>4</sub>', R<sub>5</sub>', m' and n' are independently selected from the groups defining R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, m and n above, with the proviso that vinyl is not present; or

(ii') a compound having the Formula III:

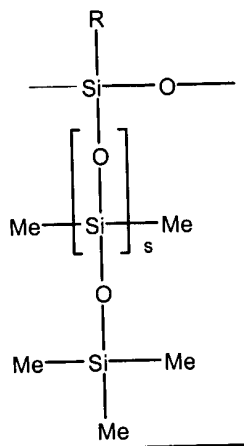


wherein:

R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub>, R<sub>10</sub> and R<sub>11</sub> are independently selected from: hydrogen, C<sub>1-20</sub> alkyl, C<sub>1-20</sub> haloalkyl, phenyl or C<sub>1-10</sub> alkylphenyl;

p and q are independently integers from 0 to 800; and

T is selected from the group consisting of: a single bond, -(CH<sub>2</sub>)<sub>t</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>t</sub>CH<sub>2</sub>O- and



wherein:

t is an integer from 0-10; R is selected from: C<sub>1-20</sub> alkyl, C<sub>1-20</sub> haloalkyl, phenyl or C<sub>1-10</sub> alkylphenyl; and s is an integer from 0 to 800; and

(c) a catalyst;

further wherein:

the chain length of the silicone base resin as defined by the sum of the values for m and n of Formula I, is always greater than the chain length of the cross-linking compound as defined by the sum of the values for m' and n' of Formula II, or the sum the values for p, q and s of Formula III; and

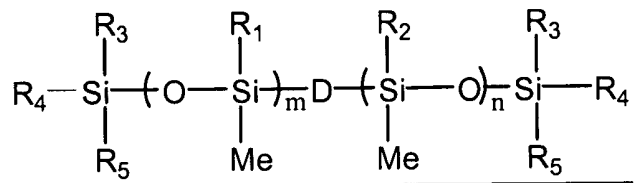
wherein said abrasive substrate is applied on top of a protective substrate.

48. (Currently amended) ~~The probe cleaning apparatus according to claim 2;~~ A probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:

(i) an abrasive substrate layer; and

(ii) a tacky gel layer, wherein said tacky gel layer is in contact with an abrasive surface of the abrasive substrate; said tacky gel layer comprising:

(a) a silicone base resin having the Formula I:



wherein:

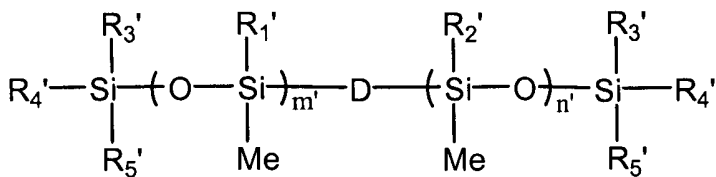
R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are independently selected from: hydrogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> haloalkyl, vinyl or C<sub>1-6</sub> acryloxyalkyl, and at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is a vinyl group;

D is a divalent linkage selected from the groups consisting of: -O-, -S-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>O- and -O(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, wherein r is an integer from 0-10;

n and m are independently integers from 0 to 1000, and the sum of n and m is not less than about 10; and

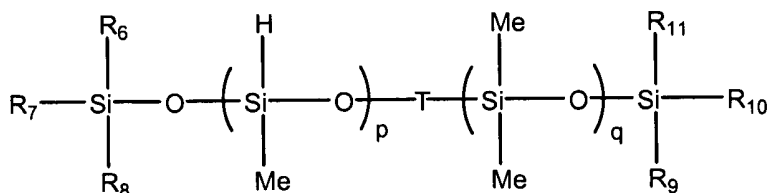
(b) a cross-linking compound selected from:

(i') a compound having the Formula II:



wherein, R<sub>1</sub>', R<sub>2</sub>', R<sub>3</sub>', R<sub>4</sub>', R<sub>5</sub>', m' and n' are independently selected from the groups defining R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, m and n above, with the proviso that vinyl is not present; or

(ii') a compound having the Formula III:

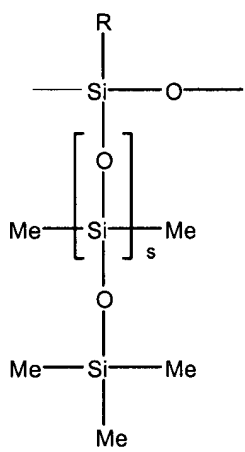




wherein:

$R_6, R_7, R_8, R_9, R_{10}$  and  $R_{11}$  are independently selected from: hydrogen,  $C_{1-20}$  alkyl,  $C_{1-20}$  haloalkyl, phenyl or  $C_{1-10}$  alkylphenyl;  

$p$  and  $q$  are independently integers from 0 to 800; and  
 $T$  is selected from the group consisting of: a single bond,  $-(CH_2)_tCH_2-$ ,  $-(CH_2)_tCH_2O-$  and



wherein:

$t$  is an integer from 0-10;  $R$  is selected from:  $C_{1-20}$  alkyl,  $C_{1-20}$  haloalkyl, phenyl or  $C_{1-10}$  alkylphenyl; and  $s$  is an integer from 0 to 800; and

(c) a catalyst;

further wherein:

the chain length of the silicone base resin as defined by the sum of the values for  $m$  and  $n$  of Formula I, is always greater than the chain length of the cross-linking compound as defined by the sum of the values for  $m'$  and  $n'$  of Formula II, or the sum the values for  $p$ ,  $q$  and  $s$  of Formula III; and

wherein said abrasive substrate layer is heterogeneous and comprises:

- (aA) a first layer of a material, and
- (bB) a second layer of a different material than said first layer, having an abrasive

surface.

49. (Original) The probe cleaning apparatus according to claim 1, wherein said tacky gel layer is self-healing.

50. (Original) The probe cleaning apparatus according to claim 29, wherein said tacky gel layer is self-healing.

51. (Original) The probe cleaning apparatus according to claim 1, wherein the tacky gel layer comprises from about 2.0 to 5.0 wt.% of a cross-linking compound.

52. (Original) The probe cleaning apparatus according to claim 51, wherein said tacky gel layer comprises from about 2.0 to 3.0 wt.% of a cross-linking compound.

53. (Original) The probe cleaning apparatus according to claim 1, wherein the catalyst is a curing catalyst.

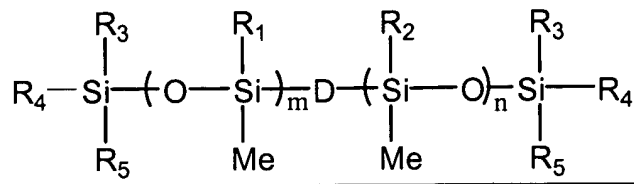
54. (Original) The probe cleaning apparatus according to claim 53, wherein the said curing catalyst is a platinum containing catalyst.

55. (Currently amended) ~~The probe cleaning apparatus according to claim 1,~~ A probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:

(i) an abrasive substrate layer; and

(ii) a tacky gel layer, wherein said tacky gel layer is in contact with an abrasive surface of the abrasive substrate; said tacky gel layer comprising:

(a) a silicone base resin having the Formula I:



wherein:

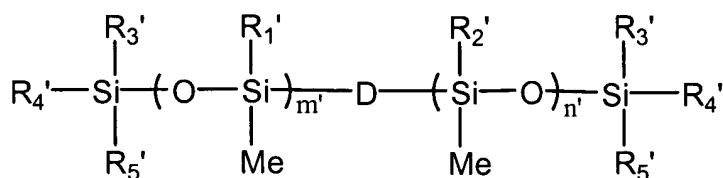
R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are independently selected from: hydrogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> haloalkyl, vinyl or C<sub>1-6</sub> acryloxyalkyl, and at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is a vinyl group;

D is a divalent linkage selected from the groups consisting of: -O-, -S-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>O- and -O(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, wherein r is an integer from 0-10;

n and m are independently integers from 0 to 1000, and the sum of n and m is not less than about 10; and

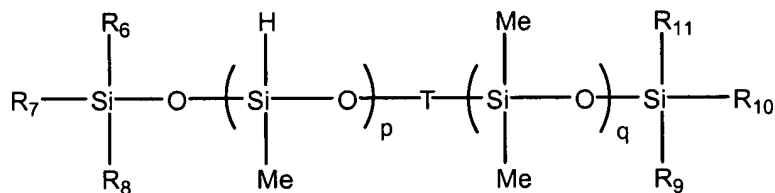
(b) a cross-linking compound selected from:

(i') a compound having the Formula II:



wherein, R<sub>1</sub>', R<sub>2</sub>', R<sub>3</sub>', R<sub>4</sub>', R<sub>5</sub>', m' and n' are independently selected from the groups defining R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, m and n above, with the proviso that vinyl is not present; or

(ii') a compound having the Formula III:

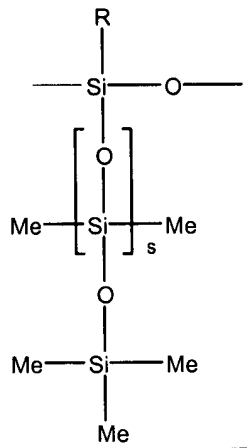


wherein:

R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub>, R<sub>10</sub> and R<sub>11</sub> are independently selected from: hydrogen, C<sub>1-20</sub> alkyl, C<sub>1-20</sub> haloalkyl, phenyl or C<sub>1-10</sub> alkylphenyl;

p and q are independently integers from 0 to 800; and

T is selected from the group consisting of: a single bond, -(CH<sub>2</sub>)<sub>t</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>t</sub>CH<sub>2</sub>O- and



wherein:

t is an integer from 0-10; R is selected from: C<sub>1-20</sub> alkyl, C<sub>1-20</sub> haloalkyl, phenyl or C<sub>1-10</sub> alkylphenyl; and s is an integer from 0 to 800; and

(c) a catalyst;

further wherein:

the chain length of the silicone base resin as defined by the sum of the values for m and n of Formula I, is always greater than the chain length of the cross-linking compound as defined by the sum of the values for m' and n' of Formula II, or the sum the values for p, q and s of Formula III; and

said apparatus further comprising a removable protective film applied to the surface of the tacky gel layer.

56. (Original) The probe cleaning apparatus according to claim 29, wherein the tacky gel layer comprises from about 2.0 to 5.0 wt.% of a cross-linking compound.

57. (Original) The probe cleaning apparatus according to claim 56, wherein said tacky gel layer comprises from about 2.0 to 3.0 wt.% of a cross-linking compound.

58. (Original) The probe cleaning apparatus according to claim 29, wherein the catalyst is a curing catalyst.

59. (Original) The probe cleaning apparatus according to claim 58, wherein the said curing catalyst is a platinum containing catalyst.

60. (Currently amended) ~~The probe cleaning apparatus according to claim 29,~~ A probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer, comprising:

(i) an abrasive substrate layer; and

(ii) a tacky gel layer, wherein said tacky gel layer is in contact with the abrasive surface of the abrasive substrate; said tacky gel layer comprising:

(a) a vinyl siloxane containing silicone base resin having a viscosity of from about 2000 to 10,000 cps; and

(b) a hydrosiloxane containing cross-linking compound having a viscosity of from about 2 to 1000 cps, wherein the cross-linking compound does not contain a vinyl group; and

(c) a catalyst; and

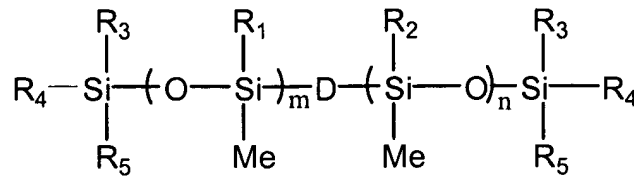
said apparatus further comprising a removable protective film applied to the surface of the tacky gel layer.

61. (Currently amended) ~~A kit comprising a probe cleaning apparatus according to claim 1,~~ for cleaning the end portion of a probe used for testing a semiconductor wafer and a probe card, said probe cleaning apparatus comprising:

(i) an abrasive substrate layer; and

(ii) a tacky gel layer, wherein said tacky gel layer is in contact with an abrasive surface of the abrasive substrate; said tacky gel layer comprising:

(a) a silicone base resin having the Formula I:



wherein:

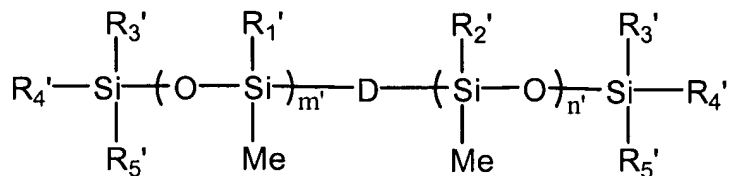
R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are independently selected from: hydrogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> haloalkyl, vinyl or C<sub>1-6</sub> acryloxyalkyl, and at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is a vinyl group;

D is a divalent linkage selected from the groups consisting of: -O-, -S-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>O- and -O(CH<sub>2</sub>)<sub>r</sub>CH<sub>2</sub>-, wherein r is an integer from 0-10;

n and m are independently integers from 0 to 1000, and the sum of n and m is not less than about 10; and

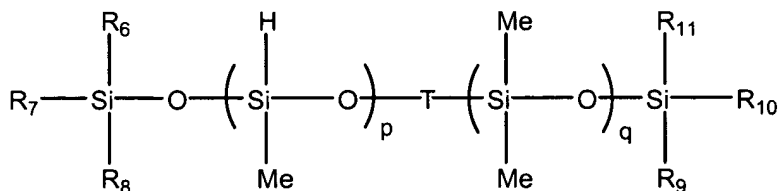
(b) a cross-linking compound selected from:

(i) a compound having the Formula II:



wherein, R<sub>1</sub>', R<sub>2</sub>', R<sub>3</sub>', R<sub>4</sub>', R<sub>5</sub>', m' and n' are independently selected from the groups defining R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, m and n above, with the proviso that vinyl is not present; or

(ii') a compound having the Formula III:

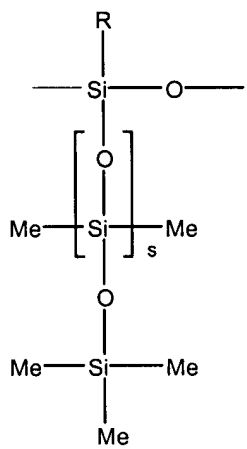


wherein:

R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub>, R<sub>10</sub> and R<sub>11</sub> are independently selected from: hydrogen, C<sub>1-20</sub> alkyl, C<sub>1-20</sub> haloalkyl, phenyl or C<sub>1-10</sub> alkylphenyl;

p and q are independently integers from 0 to 800; and

T is selected from the group consisting of: a single bond, -(CH<sub>2</sub>)<sub>t</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>t</sub>CH<sub>2</sub>O- and



wherein:

t is an integer from 0-10; R is selected from: C<sub>1-20</sub> alkyl, C<sub>1-20</sub> haloalkyl, phenyl or C<sub>1-10</sub> alkylphenyl; and s is an integer from 0 to 800; and

(c) a catalyst;

further wherein:

the chain length of the silicone base resin as defined by the sum of the values for m and n of Formula I, is always greater than the chain length of the cross-linking compound as defined by the sum of the values for m' and n' of Formula II, or the sum the values for p, q and s of Formula III.

62. (Currently amended) A kit comprising a probe cleaning apparatus for cleaning the end portion of a probe used for testing a semiconductor wafer according to claim 29, and a probe card, said probe cleaning apparatus comprising:

(i) an abrasive substrate layer; and

(ii) a tacky gel layer, wherein said tacky gel layer is in contact with an abrasive surface of the abrasive substrate; said tacky gel layer comprising:

(a) a vinyl siloxane containing silicone base resin having a viscosity of from about 2000 to 10,000 cps; and

(b) a hydrosiloxane containing cross-linking compound having a viscosity of from about 2 to 1000 cps, wherein the cross-linking compound does not contain a vinyl group; and

(c) a catalyst.

63. (New) The probe cleaning apparatus according to claim 1, said abrasive means comprising abrasions, at least two of said abrasions having a spacing between said at least two said abrasions smaller than the width of a probe tip.

64. (New) The probe cleaning apparatus according to claim 29, said abrasive means comprising abrasions, at least two of said abrasions having a spacing between said at least two said abrasions smaller than the width of a probe tip.



### **REMARKS/ARGUMENTS**

Claims 1, 5-8, 10, 12, 29, 33-36, 38, 47, 48, 55 and 60-62 were amended. Claims 63 and 64 were added. Claims 1-64 are pending in the application. Reconsideration of the application is requested in light of the following remarks.

The Examiner rejected claims 29-45, 50, 56-60 and 62 under 35 U.S.C. 112, first paragraph, and claims 1-28, 33-36, 46-49, 51-55 and 61 under 35 U.S.C. 112, second paragraph. The Examiner rejected claims 1, 2, 5-9, 18-30, 33, 37, 46, 51-54, and 56-69 under 35 U.S.C. 102; and claims 49 and 50 under 35 U.S.C. 102/103. The Examiner objected to the specification under 37 C.F.R. § 1.71. The Examiner objected to claims 1-28, 46-49, 51-55 and 61; claim 48; claims 7 and 35; and claims 5-8. The Examiner indicated that claims 3, 4, 10-17, 47, 48, 55, and 61; 31, 32, 38-45, 60 and 62; 34 and 36; and 35 would be allowable if rewritten.

#### **Claims 29-45, 50, 56-60 and 62 under 35 U.S.C. 112, first paragraph**

The Examiner rejected claims 29-45, 50, 56-60 and 62 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Specifically, it was suggested that (a) a vinyl siloxane ingredient and (b) a hydrosiloxane ingredient viscosity measurement temperature were not disclosed. Applicant respectfully submits that the specification does disclose temperatures in relation to the viscosity measurement of the claimed elements.

Paragraph 0059 discloses vinyl siloxane and hydrosiloxane. Paragraph 0063 describes silicone polymer properties for the silicone base resin and refers to “room temperature viscosity....” Paragraph 0066 describes crosslinker properties, and also refers to “room temperature viscosity....” Thus, paragraphs 0059, 0063 and 0066 of the specification disclose a viscosity measurement temperature for among other things (a) a vinyl siloxane ingredient and (b) a hydrosiloxane ingredient. Since a measurement temperature is disclosed, the specification conforms to 35 U.S.C. 112, first paragraph. Therefore, the specification is enabling.

#### **Claims 1-28, 46-49, 51-55 and 61 under 35 U.S.C. 112, second paragraph**

The Examiner rejected claims 1-28, 46-49, 51-55 and 61 under 35 U.S.C. 112, second paragraph as indefinite. Specifically, the Examiner pointed out that the word “or” was used as the conjunction in a Markush group rather than “and.” Applicant has amended claim 1 to recite “and” in the Markush group describing the alternative possibilities for T. By addressing the

Examiner's concerns regarding claim 1, the remaining claims under this rejection are also addressed.

**Claims 33-36 under 35 U.S.C. 112, second paragraph**

The Examiner rejected claims 33-36 under 35 U.S.C. 112, second paragraph as lacking proper antecedent basis, and the Examiner pointed out that the claims should claim dependency to claim 30 rather than claim 29. Applicant has amended the claims to address the Examiner's concerns.

**Claims 1, 2, 5-9, 18-30, 33, 37, 46, 51-54, and 56-69 under 35 U.S.C. 102 and Claims 49 and 50 under 35 U.S.C. 102/103**

The Examiner rejected claims 1, 2, 5-9, 18-30, 33, 37 46, 51-54, and 56-59 under 35 U.S.C. 102(b) as anticipated by Lo (U.S. Patent 4,774,111). The Examiner also rejected claims 49 and 50 under 35 U.S.C. 102/103 as anticipated by Lo or in the alternative obvious over Lo.

Claims 1 and 29 recite “a substrate layer comprising abrasion means for loosening debris on probes” while Lo merely teaches a substrate that can be “substantially smooth or rough in a regular or irregular manner.” Lo at Column 13, Lines 1-5. Lo does not teach or suggest a substrate layer comprising abrasion means for loosening debris on probes, as recited in claims 1 and 29. Therefore, claims 1 and 29, and all claims that depend on them, are patentably distinct from Lo.

**Specification Objection under 37 C.F.R. § 1.71**

The Examiner objected to the specification for lacking description of the temperature for measuring the viscosity of (a) vinyl siloxane ingredient and (b) hydrosiloxane ingredient. As discussed above, the specification sufficiently discloses a viscosity measurement temperature.

**Objection to claims 1-28, 46-49, 51-55 and 61**

The Examiner objected to claim 1-28, 46-49, 51-55 and 61 for multiple use of designators. Specifically, the Examiner pointed out that claim 1 included the use of (i) twice and (ii) twice, and also that claim 48 included the use of (a) twice and (b) twice. Applicant has amended claims 1 and 48 to address the Examiner's concerns.

**Objection to claims 7 and 35**

The Examiner objected to claims 7 and 35 for lack of a comma in each claim. Applicant has inserted the commas so that the claims read “silicon nitride, silicon oxide” rather than

“silicon nitride silicon oxide.” Therefore, the basis for the Examiner’s objection has been addressed.

**Objection to claims 5-8**

The Examiner objected to claims 5-8 for expansion of the Markush group with further Markush groups. Applicant has amended claims 5-8 to depend on claim 1 instead of claim 2 and altered the language to recite a type of material and the options for that material. Therefore, the Examiner’s objection has been addressed.

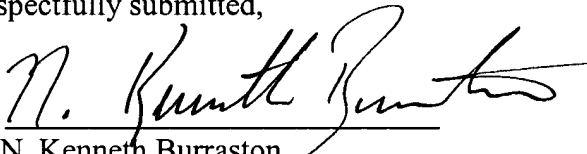
**Allowable claims 10, 12, 38, 47, 48, 55, and 60-62**

The Examiner noted that many claims would be allowable if rewritten. Applicant has amended claims 10, 12, 38, 47, 48, 55, and 60-62 to include the limitations of the base claim, but not necessarily the limitations of intervening claims. The Examiner noted reasons and made suggestions as to the allowability of these claims when rewritten. Applicant believes the current amendments meet those reasons and suggestions.

For all of the above reasons Applicant respectfully requests withdrawal of the rejections and the objections and respectfully requests allowance of the application.

Date: October 21, 2003

Respectfully submitted,

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